Amendments to the Specification

On page 13, please rewrite the fourth paragraph (paragraph 0085 of the published application) as follows:

The prior art systems first estimate each user's DOA values 2 from the received uplink signals 1, then construct the downlink channel responses (DCRs) 3 using downlink steering vectors for the estimated DOAs. Finally, the DCRs are set as the downlink beamforming vectors 4. As discussed in the first section of this application, the prior art system is very complicated in the sense that all users' DOAs are to be estimated; also, this system cannot provide enough downlink capacity to match its uplink counterpart.

Please rewrite the paragraph bridging pages 13 and 14 (paragraph 0086 of the published application) as follows:

FIG. 2 illustrates how embodiments of the system and method of the present invention can overcome this problem. The received signals 1 are first passed to generate uplink beamforming weights 5, with which the desired signals are separated by using demultiplexing. The uplink beamforming weights 5 are then used to generate downlink beamforming weights 4. One example of a technique for generating downlink beamforming weights is a null constraint method described in Singapore Patent Application No. 9904733.4. The signals to be transmitted to the individual mobile users are multiplexed first with the downlink beamforming weights 4; then transmitted to the physical channels.

On page 14, please rewrite the first full paragraph (paragraph 0087 of the published application) as follows:

A DS-CDMA system is used to describe how and why the uplink beamforming weights 5 are modified to generate downlink beamforming weights 4. Suppose N mobile users share the same sector in which an M-element uniform linear array (ULA) is provided. Narrowband signals are spread to wideband signals using different spreading codes. For uplink, signals received at the base station antenna array are first despread, then passed into an adaptive beamformer with uplink beamforming weights 5, followed by a Rake combiner. For downlink, signals to be transmitted are first multiplexed at the base station antenna array using downlink beamforming weights 4, then transmitted through physical channels: At the mobile terminals, Rake combiners are employed in order to detect the information signal.

On page 18, please rewrite the second full paragraph (paragraph 0104 of the published application) as follows:

FIG. 4 illustrates the downlink beamforming weight generator using the null constrained (NC) method proposed in Singapore patent application No. 9904733. The NC method consists of the following steps.

On page 18, please rewrite the third full paragraph (paragraph 0105 of the published application) as follows:

- Determine the uplink beam pattern's nulls 6, $z_{u,k}(i)$,i=1, . . . , M-1, using the polynomial formed from the uplink weights:

On page 19, please rewrite the first full paragraph (paragraph 0106 of the published application) as follows:

- Transform the phase components of the uplink beam pattern's nulls, and obtain the phase components of downlink beam pattern's nulls 7 as

On page 19, please rewrite the second, third, and fourth paragraphs (paragraph 0107, 0108, 0109 of the published application) as follows:

- Construct the downlink beam pattern's nulls 8 as $zd_{,k}(i)=A_{d,k}(i)e^{j\varphi d,k(i)}$, for i=1, . . . , M-1; and
- Construct the downlink beamforming weight vector 9:

$$\sum_{i=1}^{M} w_{d,k}(i)z^{-i+1} = w_{d,k}(1)(1-z_{d,k}(1)z^{-1})\cdots(1-z_{d,k}(M-1)z^{-1}) \quad (8)$$

In constructing the downlink nulls 8, we may choose $A_{d,k}(i)A_{u,k}(i)$ or simply $A_{d,k}(i)=1$ for i=1, . . . , M-1.

Please rewrite the second full paragraph of page 21 (paragraph 0116 of the published application) as follows:

In view of the similarities between the generated beam patterns using real and virtual UBPCTs, according to embodiments of the present invention, downlink beamforming weights can be generated by modifying uplink beamforming weights via a beam synthesis (BES) method 10, shown in FIG. 6. This method tries to constrain the same positions for nulls and main beams of both links' beam patterns.

Please rewrite the paragraph bridging pages 21 and 22 (paragraph 0121 of the published application) as follows:

FIG. 7 illustrates a schematic flow chart of an embodiment of the BES method, which incorporates some pre-processing techniques 11, such as the selection of antenna spacing, and sectorisation and a post-processing technique, such as a null-moving method. These pre- and post-processing techniques can be used individually, or jointly.

On page 24, please rewrite the first full paragraph (paragraph 0127 of the published application) as follows:

According to another embodiment of the present invention which involves a post-processing technique, the null-wrapping phenomenon can be completely alleviated via a null-moving method 12 by moving any bad nulls to safe positions. Specifically, if the uplink null's DOA,$\theta_{u,k}$, satisfies the condition that $|\theta_{u,k}| >= |\theta_0|$, and the generated pseudo null is near the uplink main beam, then $\theta_{u,k}$ is reset to be $\tilde{\theta}_{u,k}$ which is within the interval $[-|\theta_0|, |\theta_0|]$. There are many ways to reset $\theta_{u,k}$. Considering the mirroring property of the original null and the pseudo null, one simple method is to choose $\tilde{\theta}_{u,k}$ $=0^\circ$, which means putting greater interference suppression at $\theta=0^\circ$. Another more effective method is, if the DOAs of all users are known, to put $\tilde{\theta}_{u,k}$ as the DOA with which high rate users are located, or large numbers of interfering users are located. When multiple bad nulls exist, these bad nulls can be moved to several positions in order to obtain larger interference suppression at the DOAs the designers want.

Please rewrite the paragraph bridging pages 24 and 25 (paragraph 0128 of the published application) as follows:

According to a further embodiment of the present invention, the null-wrapping problem can also be alleviated by the combination of the above three pre- and post-processing techniques.

For example, for f_u=1.8 GHz, f_d=2.0 GHz, and $z=\lambda_u/2$, the null-wrapping DOA threshold is θ_0=53.1°. Therefore, even though one cell is split into three sectors with which the useful nulls are within the interval [-60°, 60°], there are still bad nulls located in [-60°, 53.1°] and [53.1°, 60°]. In this case, the null-moving method 12 can be used to move the bad nulls to safe positions, which are within the interval [-53.1°, 53.1°]. Further examples comprise the proper selection of the antenna spacing as well as sectorisation or the combination of sectorisation and the null-moving method 12 as another option. It should be noted that the latter method is more effective. In fact, in the null-moving method 12, moving the bad nulls to a safe position is at the price of putting large antenna gain at the original bad null's position. However, since no effective users exist in the DOA interval near that position by virtue of sectorisation, there is little disadvantage. For a system having given antenna spacing and sectorisation, the null-moving method 12 is an advantageous technique for alleviating the null-wrapping problem.

On page 25, please rewrite the first full paragraph (paragraph 0129 of the published application) as follows:

FIG. 9 shows the generated beam patterns for uplink and downlink using NC method and BES method 10, the BES method 10 being a post-processing null-moving technique 12. Here the antenna number is 12. Suppose the desired user is located at θ=60°. It is seen that the uplink main beam is below but in the same general direction as the desired user. The NC method keeps the uplink beam pattern's nulls for downlink, however, due to the presence of a null repeat problem, it also puts a null at θ=60°, which means no matter what the transmission power from the base station is, assigned to this user, the desired user will never receive power. However, using the beam splitting (BES) method together with a null-moving technique as described above, by moving the two nulls at -58^0 and -69.1^0 to other places, the main beam in the direction of the desired user is near optimum, thus this user can still possess good downlink transmission.